translation for the Examiner's convenience. The Japanese reference is drawn to a brass alloy having utility as a component for a heat exchanger. The translation identifies in paragraph [0008] that the alloy composition, by weight, is 8-20% zinc, 0.3-1.5% nickel, 0.3-1.2% tin, 0.005%-0.20% phosphorous with the balance being copper. The ratio of nickel to phosphorous is disclosed as ranging from 5 to 50. Applicants have discovered, as disclosed in applicant's specification at page 8, lines 204-206, that for electrical connector applications, a nickel:phosphorous ratio of less than 7.5:1 achieves both increased yield strength and enhanced resistance to stress relaxation. This is established with reference to applicant's Figure 1 and the specification at page 8, lines 207-210, where alloy X, with a nickel to phosphorous ratio of 20:1 has both reduced yield strength and reduced resistance to stress relaxation when compared to alloy Y and alloy Z (both having a Ni:P ratio of 5:1).

While JP 5-311,292 broadly discloses a nickel to phosphorous ratio of between 5:1 and 50:1, there is nothing in the reference to teach or suggest that for electrical connector applications, a critical maximum nickel to phosphorous ratio is 7.5:1. JP 5-311,292 discloses comparative alloy 13 in reference Table 1. This alloy has a composition of 17.5% zinc, 0.27% nickel, 0.20% tin, 0.05% phosphorous and the balance is copper. While the nickel content is outside that claimed by applicants, the nickel to phosphorous ratio is 5.4. The reference discloses in paragraph [0039] that comparative alloy 13 had inferior strength and stress related corrosion and cracking resistance. Therefore, there is nothing in JP 5-311,292 to teach or suggest to one skilled in the art to utilize brass alloys at the low end of the claimed nickel to phosphorous ratio. There is further nothing in the reference to teach or suggest the applicability of the reference alloys for use as an electrical connector. Applicant's claims should be allowed over JP 5-311,292.

Claims 1, 3 and 6-14 were rejected under 35 USC 103 as unpatentable over United States Patent No. 4,362,579 to Tsuji, JP 4-354,843, JP 6-184,679, JP 59-12674 or JP 7-126,779.

U.S. 4,362,579 discloses a copper-nickel-silicon-zinc alloy that may include one or more optional additions. Both tin and phosphorous are included among the list of potential optional additions. However, not one of the exemplary alloys disclosed in the reference includes both tin and phosphorous. The reference discloses a nickel range of between 0.4 and 8 and an optional phosphorous range of between 0.001 and 0.1. These values correspond to a nickel:phosphorous ratio of between 4:1 and 8,000:1. There is nothing in the reference to teach or suggest a critical maximum nickel to phosphorous ratio of 7.5:1 for enhanced electrical properties. In addition, the reference specifies that a minimum of 0.1 silicon is required in the reference alloys. While there

may be minimal overlap with applicant's claimed value of less than 0.1% of silicon, the reference leads one skilled in the art to higher silicon contents.

In view of U.S. 4,362,579 neither teaching nor suggesting a critical maximum nickel to phosphorous ratio of 7.5:1 and further leading one skilled in the art to silicon contents greater than 0.1, applicant's claims are neither taught nor suggested by the cited references. Applicant's claims should be allowed over U.S. 4,362,579.

JP 4-354,843 discloses a copper base alloy containing 7-18% zinc, 0.5-3.0% nickel, 0.5-2.0% tin and 0.01-0.20% phosphorous. The alloy is disclosed as useful in the manufacture of heat exchangers.

There is no recognition of the significance of the nickel to phosphorous ratio apparent from the translated abstract and the table at page 4 of the Japanese publication. However, with reference to that table, the exemplary alloys have a nickel to phosphorous ratio of between 10:1 (alloy number 11) and 29.33:1 (alloy number 3).

There is nothing in JP 4-354,843 to teach or suggest that for electrical connector applications a maximum nickel to phosphorous ratio of 7.5:1 provides enhanced properties. Accordingly, applicant's claims should be allowed over the cited Japanese reference.

JP 6-184,679 discloses a copper base alloy containing 5-30% zinc, 0.5-2.5% tin, 0.005-0.4% phosphorous and the balance is copper. In reference table 1, alloys 2 and 3 further contain nickel. However, in alloy 2, the phosphorous content, 0.006%, is less than the minimum claimed by applicants. In alloy 3, the nickel content, 0.18%, is less than that claimed by applicants. There is nothing in JP 6-184,679 to teach or suggest a copper alloy for use as an electrical connector having zinc, nickel, tin and phosphorous all within the ranges claimed by the applicants. Applicant's claims should be allowed over the cited reference.

At column 1, lines 6-7, it appears that JP 6-184,679 discloses a range of 0.01 to 1.0 nickel. If this is correct, then the reference discloses nickel to phosphorous ratios of between 0.025:1 and 200:1. There is nothing in the reference to teach or suggest that to obtain superior properties for an electrical connector, the nickel to phosphorous ratio should be maintained between 3.5:1 and 7.5:1. Applicant's claims should be allowed over the cited reference.

JP 59-126,742 discloses a copper alloy useful as a welded tube for a radiator. The copper alloy contains 25-40% zinc, 0.005%-0.070% phosphorous, 0.05-2.0% nickel and 0.05-1.0% tin. There is only minimal overlap at 25% zinc in the broadly disclosed reference composition. Not one of the alloys in reference table 1 has between 5 and 25%, by weight, of zinc as claimed by applicants. There is nothing in JP 9-126,742 to teach or suggest the applicability of the copper alloy

for use as an electrical connector. There is further nothing in the reference to teach or suggest a copper alloy with 25% zinc as a maximum as opposed to a minimum. Applicant's claims should be allowed over the cited reference.

JP 7-126,779 discloses a composite material having a copper alloy substrate that contains between 0.1 and 15% nickel, 0.1 and 10% tin and 0.005 and 0.5% phosphorous. From column 1 of page 2 of the Japanese reference, it appears that numerous other elements may be present in amounts of between 0.01 and 40%. Among the voluminous list of other elements is zinc. The broadly disclosed nickel:phosphorous ratios range between 0.2:1 and 3,000:1. There is nothing in the reference to teach or suggest a copper alloy for connector applications in which the nickel to phosphorous ratio is maintained between 3.5:1 and 7.5:1. Rather, in the table at the top of page 5, exemplary alloys 1 and 2 are zinc-free and have nickel:phosphorous ratios between 21.4:1 and 27.3:1. The only other disclosed alloy contains zinc but appears to be free of nickel, tin and phosphorous. There is nothing in the reference to teach or suggest a brass alloy suitable for use as an electrical connector as claimed by the applicants. Applicant's claims should be allowed over JP 7-126,779.

Claims 1, 3-4 and 6-14 were rejected under 35 U.S.C. 103 as unpatentable over JP 5-311,294; JP-5-311,295 or JP 6-228,684.

JP 5-311,294 discloses a copper alloy suitable for use as a heat exchanger. The alloy contains zinc, nickel, tin, phosphorous and boron. The nickel to phosphorous ratio is maintained at 15.0:1. There is nothing in JP 5-311,294 to teach or suggest a copper alloy suitable for use as an electrical connector having a nickel to phosphorous ratio of between 3.5:1 and 7.5:1. Applicant's claims should be allowed over the cited Japanese reference.

JP 5-311,295 discloses a copper alloy suitable for use as a heat exchanger that contains zinc, nickel, tin, manganese, and phosphorous. The alloy has a nickel to phosphorous ratio of 19.2:1. There is nothing in JP 5-311,295 to teach or suggest a copper alloy suitable for use as electrical connector with a nickel to phosphorous ratio of between 3.5:1 and 7.5:1. Applicant's claims should be allowed over the cited reference.

JP 6-228,684 discloses a copper alloy useful as an electrical connector that contains zinc, nickel, silicon, tin, iron, phosphorous and either magnesium or calcium. From the abstract of the disclosure, the nickel to phosphorous ratio may range between 0.5:1 and 3,000:1. There is nothing in the reference to teach or suggest the beneficial effect achieved by maintaining the nickel to phosphorous ratio in the range of 3.5:1 and 7.5:1. Applicant's claims should be allowed over the cited reference.

JP 4-231,430 discloses a beryllium copper alloy that may contain one or more additional elements. Among the extensive list of elements that can be added are nickel, zinc, tin and phosphorous. As these are optional elements, there is no recognition of maintaining a nickel to phosphorous ratio. However, within the ranges disclosed for these additions is a nickel to phosphorous ratio range of between 0.002:1 and 5,000:1. The reference further teaches 0.1% beryllium as a minimum as opposed to a maximum as claimed in applicant's claims.

There is nothing in the reference to teach or suggest a copper alloy suitable for use as an electrical connector with a nickel to phosphorous ratio in the range of 3.5:1 to 7.5:1 and a maximum of 0.1% beryllium. Applicant's claims should be allowed over the cited Japanese reference.

JP 5-059,467 discloses a copper alloy that contains tin, phosphorous and magnesium. Optionally, the alloy may contain between 0.01 and 15% zinc. There is nothing in the reference to teach or suggest an inclusion of nickel or the benefit achieved to a copper alloy useful as an electrical connector material when nickel and phosphorous are present in specified ratios. Applicant's claims should be allowed over the cited reference.

JP 6-299,275 discloses an electrical alloy containing zinc, tin, iron and phosphorous and optionally either nickel and/or silicon. The presence of nickel as solely an optional addition indicates no recognition of the benefits obtained by a copper alloy having a controlled nickel to phosphorous ratio. When nickel is present, the reference discloses nickel to phosphorous ratios of between 0.4:1 and 120:1. Applicant's claims should be allowed over the cited reference.

Claims 1 and 3-14 were rejected under 35 U.S.C. 103 as unpatentable over JP 6-179,932. The reference discloses a copper alloy containing zinc and magnesium and may further contain one or more of additional elements. Among the specified additional elements are tin, phosphorous and nickel. In addition, zinc may be present in an amount of 0.01-15%. Both nickel and phosphorous are disclosed as optional elements and there is nothing in the reference to teach or suggest that by maintaining a nickel to phosphorous ratio of between 3.5:1 and 7.5:1 beneficial properties for an electrical connector are achieved. Within the ranges promulgated for nickel and phosphorous, the reference discloses ratios of between 0.0025:1 and 400:1. Applicant's claims should be allowed over the cited reference.

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

A Supplemental Information Disclosure Statement accompanies this Amendment.

RESPONSE UNDER 37 CFR 1.116
EXPEDITED PROCEDURE
EXAMINING GROUP: 1742

NOTICE OF APPEAL

In th event that the claims remain subject to rejection, a Notice of Appeal accompanies this Amendment.

Entry of this Amendment and reconsideration of the claims as amended is respectfully requested. It is believed that the claims as amended are in condition for allowance, or in the alternative in better condition for Appeal, and satisfy the requirements of 37 CFR 1.116. If the Examiner believes that a further Amendment is necessary to place the claims in condition for allowance, he is invited to contact applicant's attorney at the telephone number listed below.

Respectfully submitted
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